REPLACEMENT SHEETS

WHAT IS CLAIMED IS:

1.-14. [Cancelled]

15. A probe for autonomously operating within the intestinal tract of a living organism, comprising:

at least one sensor capable of collecting information relating to said organism;

a data processor; and

a communications device;

wherein said data processor and said communications device comprises a single semi-conductive die.

16. The probe of Claim 15, wherein said data processor comprises at least a processor core optimized for reduced power consumption.

17. The probe of Claim 16, wherein said at least processor core includes at least one sleep mode.

18. The probe of Claim 17, wherein said at least one sleep mode is adapted to selectively place portions of said at least processor core in a state of reduced power consumption.

19. The probe of Claim 17, wherein said at least one sleep mode is entered or exited via at least one signal generated external to said probe.

20. The probe of Claim 15, wherein said core comprises at least one instruction, said at least one instruction being adapted to perform at least one mathematical operation.

21. The probe of Claim 20, wherein said at least one mathematical operation comprises a fast-fourier transform (FFT).

22. The probe of Claim 20, wherein said at least one mathematical operation comprises a butterfly calculation.

23. The probe of Claim 20, wherein said at least one mathematical operation comprises a calculation in support of error correction.

24. The probe of Claim 15, wherein said communications device comprises at least a portion of a direct sequence spread spectrum (DSSS) transceiver.

25. The probe of Claim 15, wherein said communications device comprises at least a portion of a frequency hopping spread spectrum (FHSS) transceiver.

26. The probe of Claim 15, wherein said communications device comprises at least a portion of a time-modulated ultra-wide bandwidth (TM-UWB) transceiver.

27. A method of producing a probe for use in a living subject, comprising;

generating a design for an integrated circuit useful with said probe, said design adapted to meet at least one design criterion associated with said probe;

converting said design to an integrated circuit device; and

incorporating said integrated circuit within said probe.

28. The method of Claim 27, further comprising:

selecting at least one sensor for use with said probe; and

selecting at least one communications device for use with said probe;

wherein said act of generating a design comprises generating a design adapted to interface with at least one sensor and at least one communications device.

29. The method of Claim 27, wherein said act of generating a design adapted to fit on a single semi-conductive die.

30. The method of Claim 27, wherein said act of generating a design adapted to meet at least one criterion comprises generating a design constrained to fit within a given die size, said die size being adapted to fit within said probe.

31. The method of Claim 30, wherein said act of generating a design adapted to meet at least one criterion further comprises generating a design constrained to have a given maximum power consumption.

32. The method of Claim 27, wherein said act of generating a design adapted to meet at least one criterion comprises generating a design constrained to have less than or equal to a given gate count.

33. The method of Claim 27, wherein said act of converting comprises:

simulating said design in software to produce at least one simulation;

evaluating the sufficiency of said at least one simulation; and

synthesizing said design.

34. A probe for autonomously operating within the intestinal tract of a living

organism, comprising:

at least one sensor capable of collecting information related to said organism;

a data processor adapted to process at least a portion of said information to produce data; and

a spread spectrum communications device adapted to transfer at least a portion of said data or said information off-probe.

35. A probe for autonomously operating within the intestinal tract of a living organism and adapted for use in a multi-probe environment, comprising:

at least one sensor capable of collecting information relating to said organism;

a data processor adapted to process at least a portion of said information to produce data; and

a communications device adapted to transfer at least a portion of said data or said information off-probe, said communications device further being adapted to minimize interference with other communications devices operated proximate said probe.

36. The probe of Claim 35, wherein said communications device comprises a spread-spectrum transceiver having a substantially unique spreading code.

37. The probe of Claim 35, wherein said communications device operates in the ISM band.

38. A probe for autonomously operating within the intestinal tract of a living organism, comprising:

at least one sensor capable of collecting information relating to said organism; and

a data processor adapted to process at least a portion of said information;

wherein said data processor is optimized for both die size and power consumption.

39. A substantially autonomous intestinal device manufactured by the process comprising:

providing a sensor for said intestinal device, said sensor being capable of generating data;

generating a design for an integrated circuit useful with said device, said design adapted to optimize the processing of said sensor data;

converting said design to an integrated circuit; and

incorporating said integrated circuit within said probe, said integrated circuit being in operative communication with said sensor.

40. A substantially autonomous intestinal device manufactured by the process comprising:

providing a sensor for said intestinal device, said sensor being capable of generating data;

providing a communications interface for transferring data;

generating a design for an integrated circuit useful with said device, said design having a processor core associated therewith, said design being adapted to integrate said processor core and at least a portion of said communications interface onto a single semi-conductive die;

fabricating said semi-conductive die having said integrated circuit; and

incorporating said die within said probe.

41. The intestinal device of Claim 40, wherein said act of generating further comprises optimizing the power consumption of said die by incorporating at least one extension instruction within said core.

42. A method of optimizing the power consumption of an autonomous probe, comprising:

selecting a sensor configuration for said probe;

selecting a communications configuration for said probe; and

selecting a processor configuration for said probe which optimizes the power consumption of at least one of said sensor configuration and said communications configuration.

43. The method of Claim 42, wherein said act of selecting a processor configuration comprises providing at least one customized extension instruction, said at least one instruction being adapted to perform at least one function associated with said sensor configuration and/or said communications configuration with a reduced number of processor cycles.

44. The method of Claim 43, wherein said at least one function comprises multiply-accumulate (MAC) operations.

45. The method of Claim 43, wherein said at least one function comprises image data compression.

46. An autonomous intestinal probe having at least one image sensor and a data processor operatively coupled thereto, said data processor comprising at least one instruction optimized for processing of data from said at least one image sensor.

47. The probe of Claim 46, wherein said at least one instruction comprises an FFT instruction.

48. The probe of Claim 46, wherein said at least one instruction comprises an instruction adapted to perform error correction.

49. The probe of Claim 46, wherein said at least one instruction comprises an instruction adapted to perform image compression.

50. An autonomous intestinal probe having a sensor, communications interface,